

Politecnico di Milano, Department of Energy, Cesnef (Building 19), via Ponzio 34/3, Milan
Seminar Room 1° floor

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Recent developments in Non-Evaporable Getter technology and application in vacuum systems from HV to XHV

Fabrizio Siviero

SAES Getters S.p.A.

Non-Evaporable Getter (NEG) pumps are able to efficiently absorb chemically reactive gases by binding them on their active surface. They find application in a large variety of UHV-XHV systems like analytic instruments (SEM, TEM, surface science and semiconductor industry tools), cold atomic traps, portable spectrometers and particle accelerators. The key strengths of NEG pumps are:

- the very high pumping speed, in particular for hydrogen, oxygen and water;
- the compactness, both in terms of size and weight;
- the absence of moving parts, i.e. vibrations;
- the ability to work at RT in absence of power.

During the last ten years two major innovations have been introduced, which expanded significantly the range of application of NEG materials. On one side, the integration of Sputter Ion Pump (SIP) and NEG technology allowed to approach the design of vacuum systems in a radically new and more efficient way [1]. Then, the development of the ZAO[®] alloy (ZrVTiAl) and new production processes of sintered porous pumping elements, opened the way to the use of NEG pumps in the HV pressure range (10^{-8} – 10^{-7} mbar), where a much larger capacity than UHV getter solutions is required.

The seminar will present the basic properties of NEG materials and selected examples of their application in small and large vacuum systems of scientific interest [2].

References

[1] P. Manini et al., Vacuum 94, 26 (2013).

[2] F. Siviero et al., Fusion Engineering and Design (2019), DOI 10.1016/j.fusengdes.2019.03.026

About the speaker:

Fabrizio Siviero works in the R&D labs of SAES Getters, as part of the Vacuum Systems Business Unit. He graduated in physics from the Università degli Studi di Milano in 2000 and took a PhD in the same university in 2003. Then, he had post-doctorate experiences at CNR in Trento and at the Politecnico di Milano. His research focused on the deposition and characterization of nanostructured thin films with several surface science techniques. In 2008 he joined SAES, where he is involved in the development of Non-Evaporable Getter (NEG) materials and NEG pumps, as well as their functional characterization. Part of his activity is related to the analysis of vacuum systems, from the lab scale up to large machines like particle accelerators and nuclear fusion experiments.

For further information please contact: carlo.casari@polimi.it